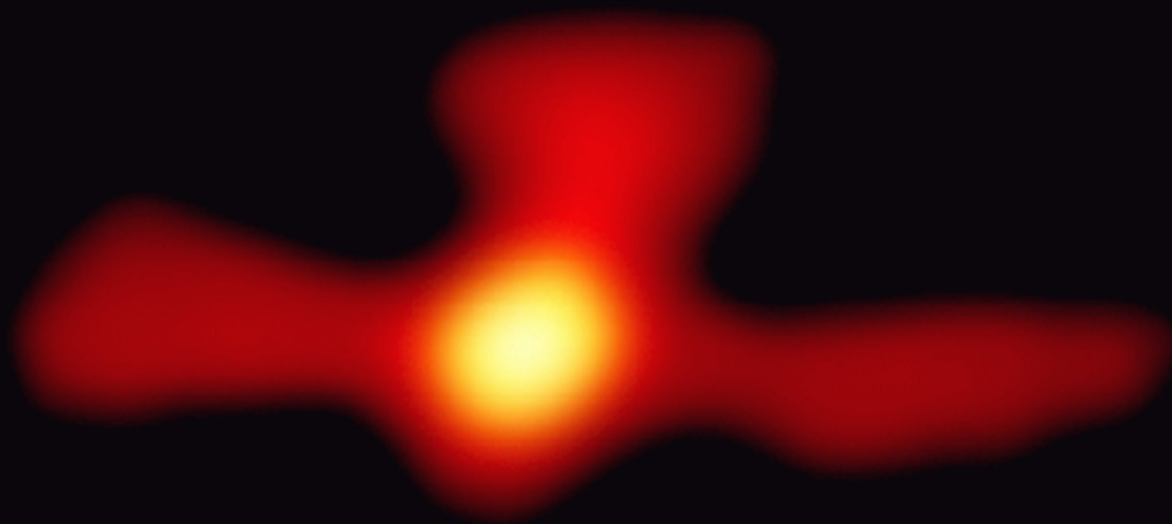




# Gamma Ray Antimatter


Instrument: CGRO OSSE  
Credit: W. Purcell (NWU)



This mysterious cloud of gamma rays glows in the center of the Milky Way, produced by annihilating antimatter particles. It is probably about 4,000 light-years across and extends nearly 3,500 light-years above the galactic center. Associated with no previously known object, the cloud seems to imply that a fountain of antimatter

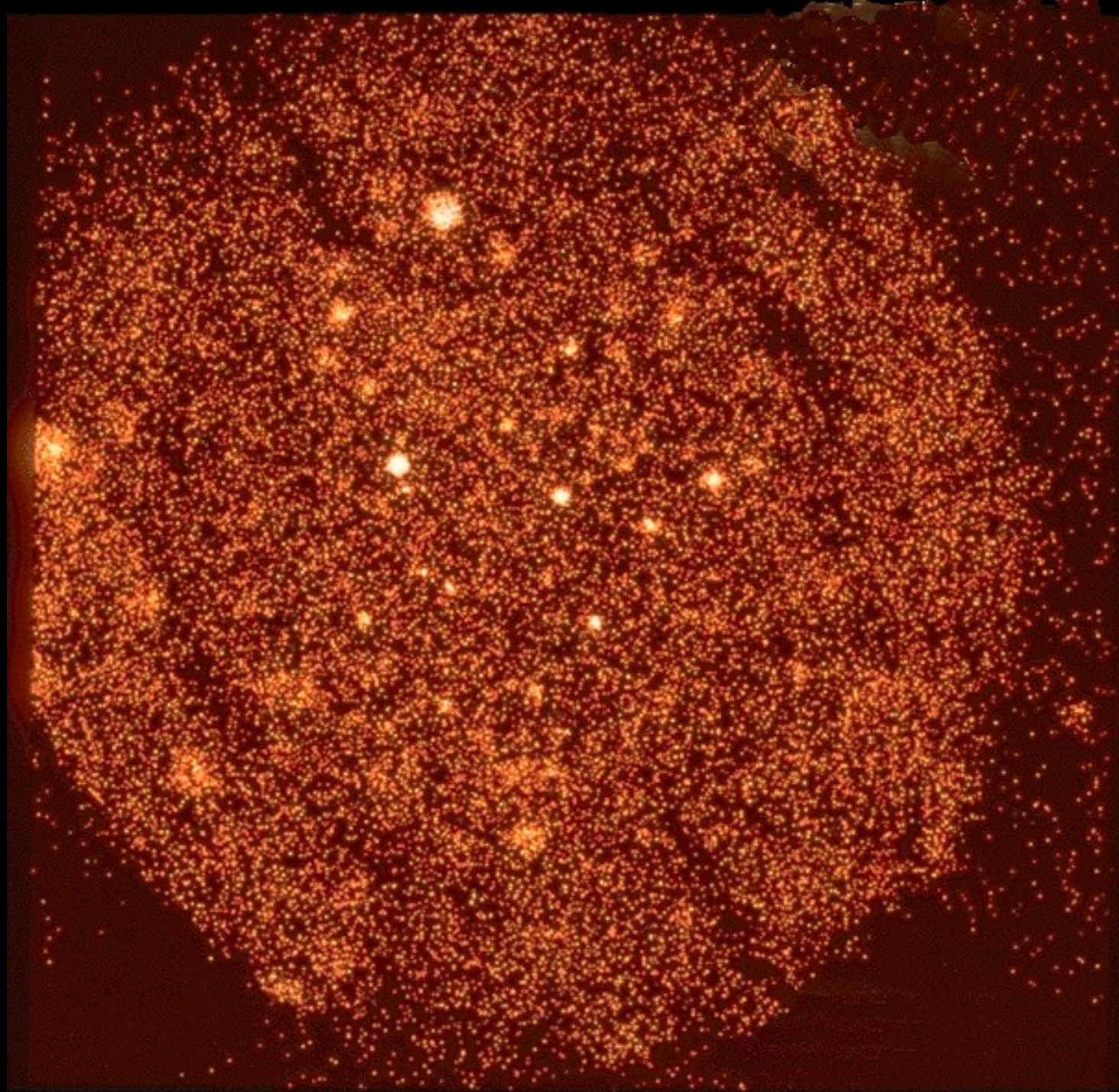


# The Search for Dark Matter



Superposed on an optical image of a group of galaxies is an image taken in X-ray light, showing confined hot gas in false purple color. Is the gravity of the galaxies high enough to contain the glowing hot gas? The extra gravity needed is attributed to dark matter, the nature and abundance of which is the biggest mystery in astronomy today.

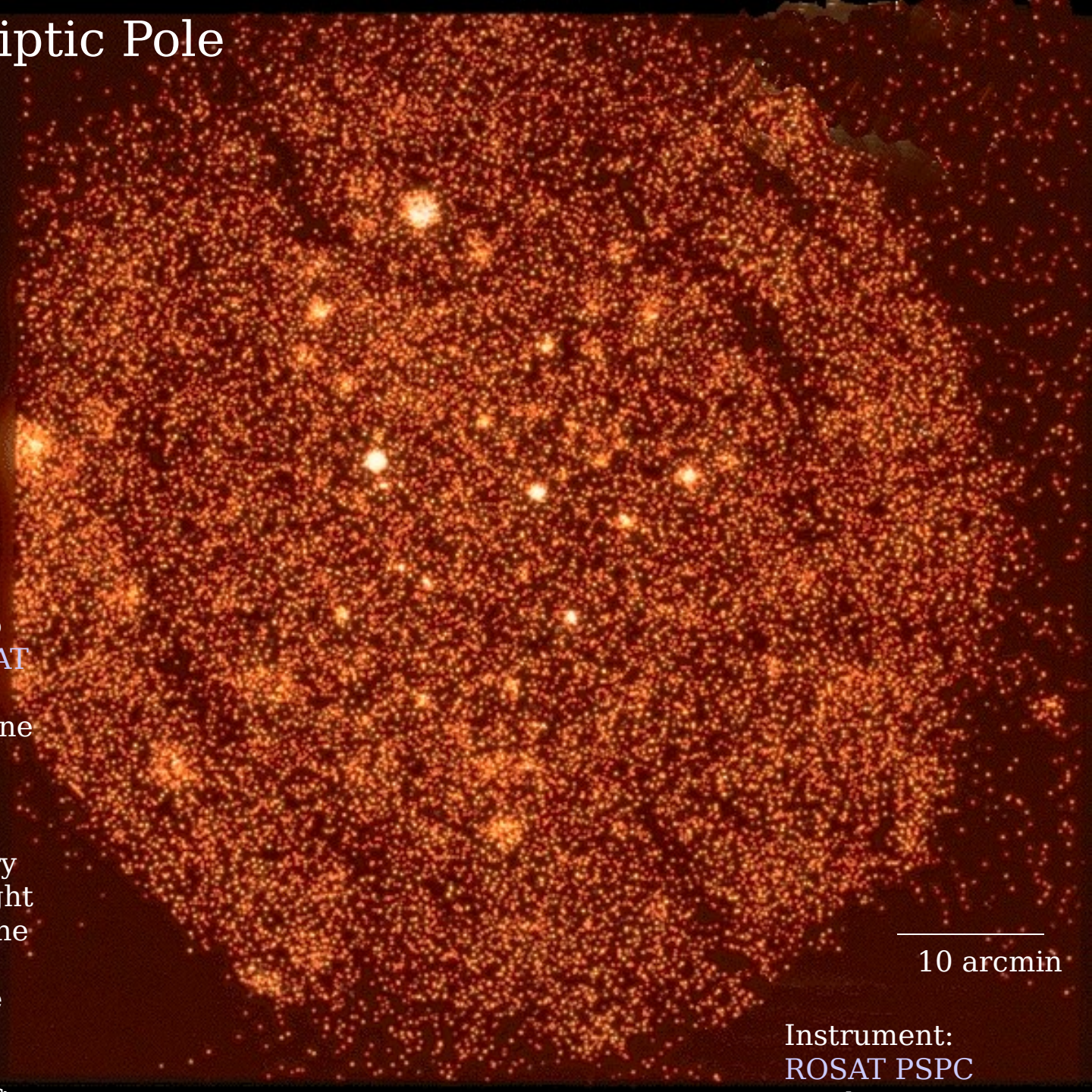






# The North Ecliptic Pole

The North Ecliptic Pole (shown here at 0.5-1.6 keV) and the South Ecliptic Pole are the two locations visible to ROSAT at any time, being perpendicular to the plane of the Earth's orbit. Because of the survey geometry, the ecliptic poles were covered every orbit, leading to the bright region at the center of the field. The ROSAT PSPC ribs and central ring are partially visible as the dark nearly linear areas

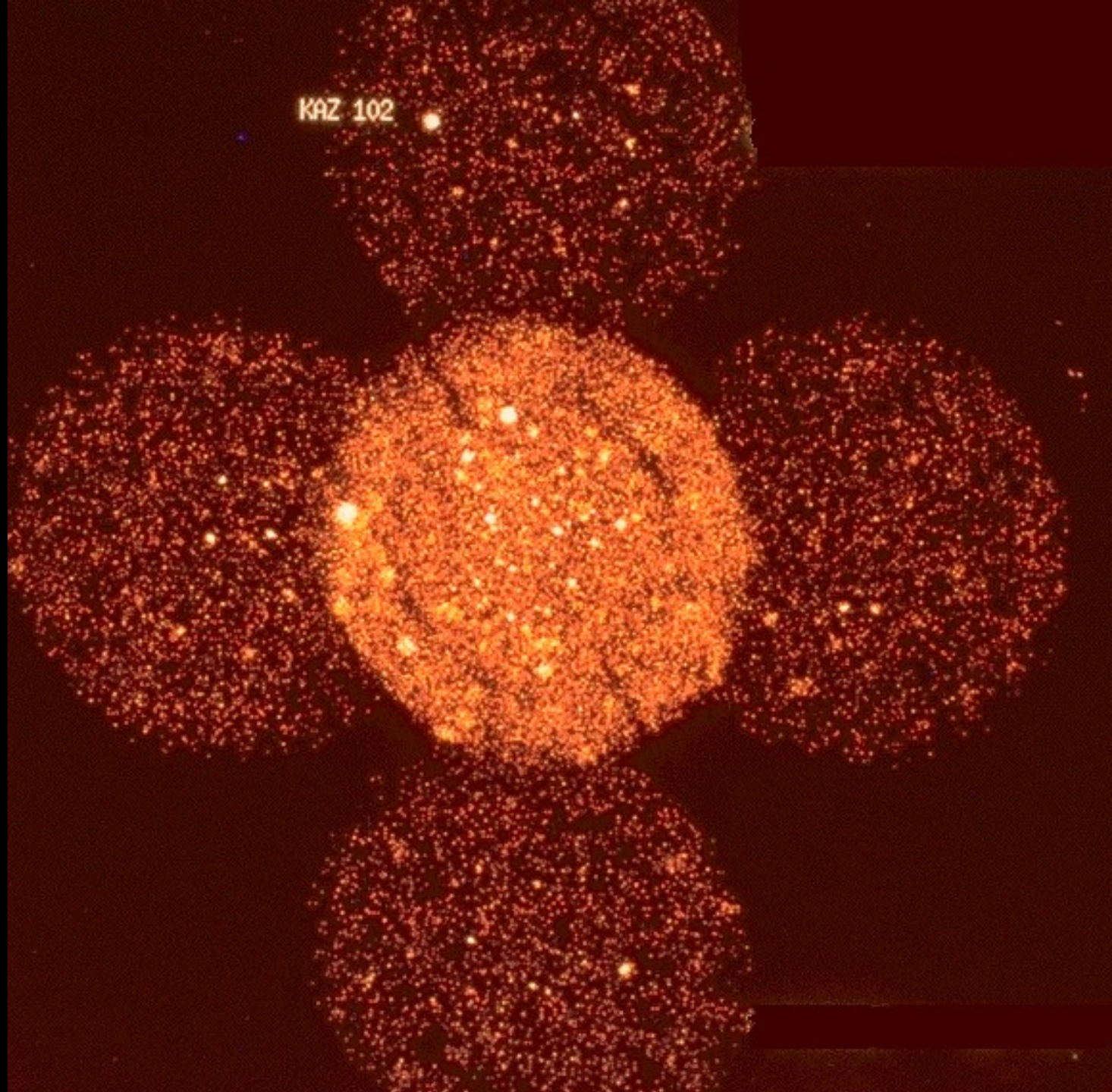


10 arcmin

Instrument:  
ROSAT PSPC

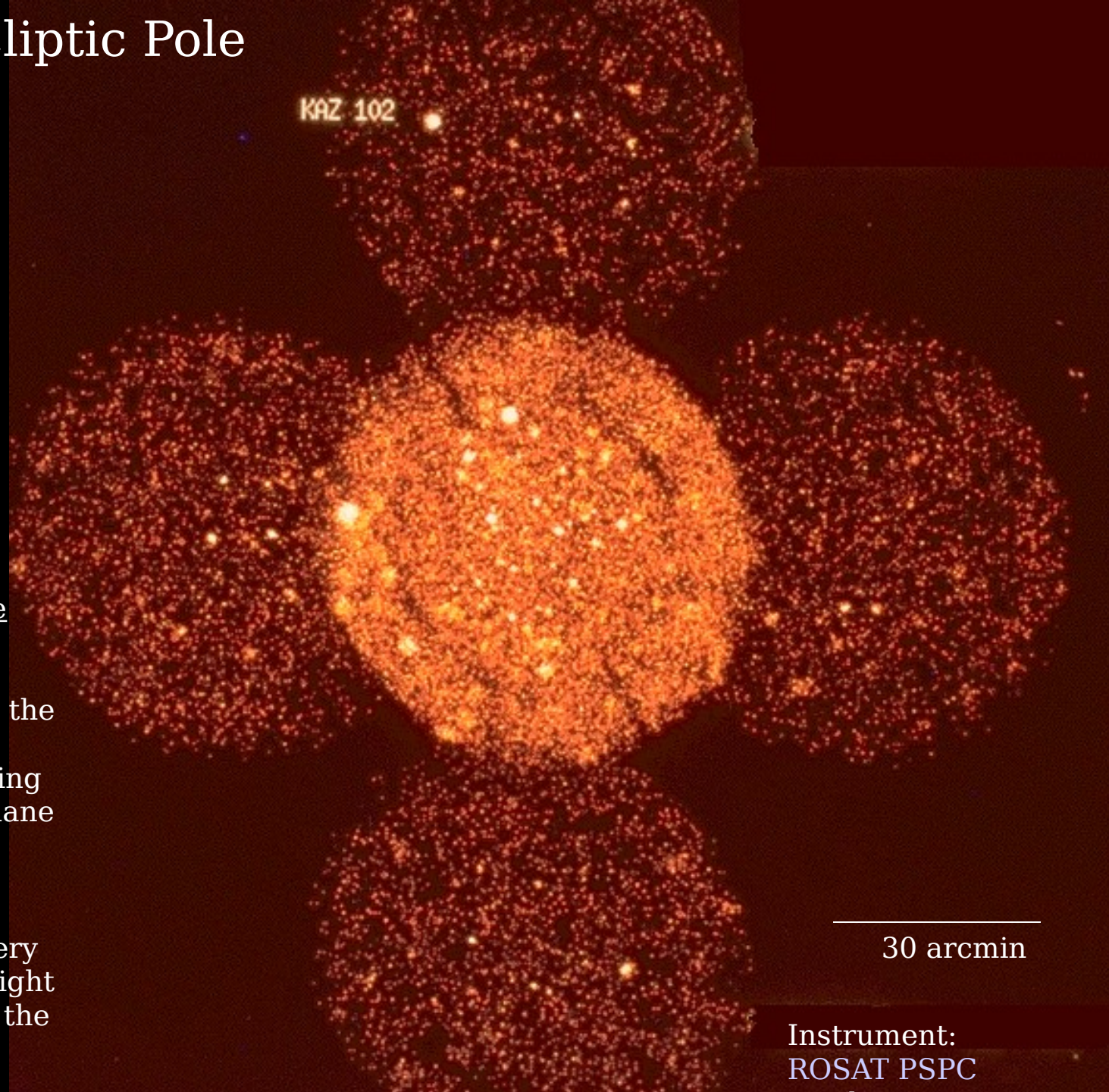


KAZ 102





# The North Ecliptic Pole



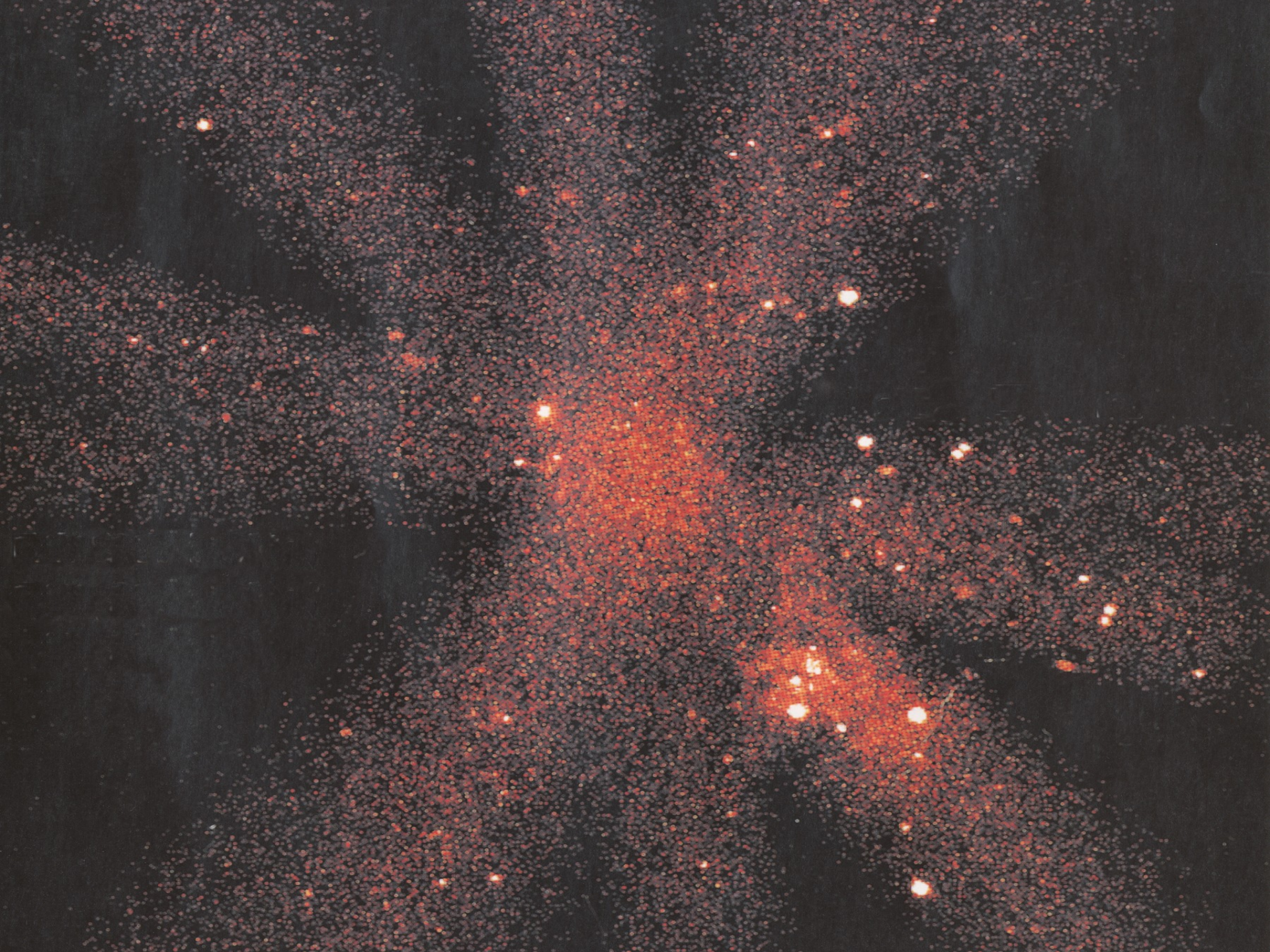
KAZ 102

The North Ecliptic Pole (shown here at 0.5-1.6 keV) and the South Ecliptic Pole are the two locations visible to ROSAT at any time, being perpendicular to the plane of the Earth's orbit. Because of the survey geometry, the ecliptic poles were covered every orbit, leading to the bright region at the center of the field. KAZ 102, an optically bright, radio

30 arcmin

Instrument:  
ROSAT PSPC





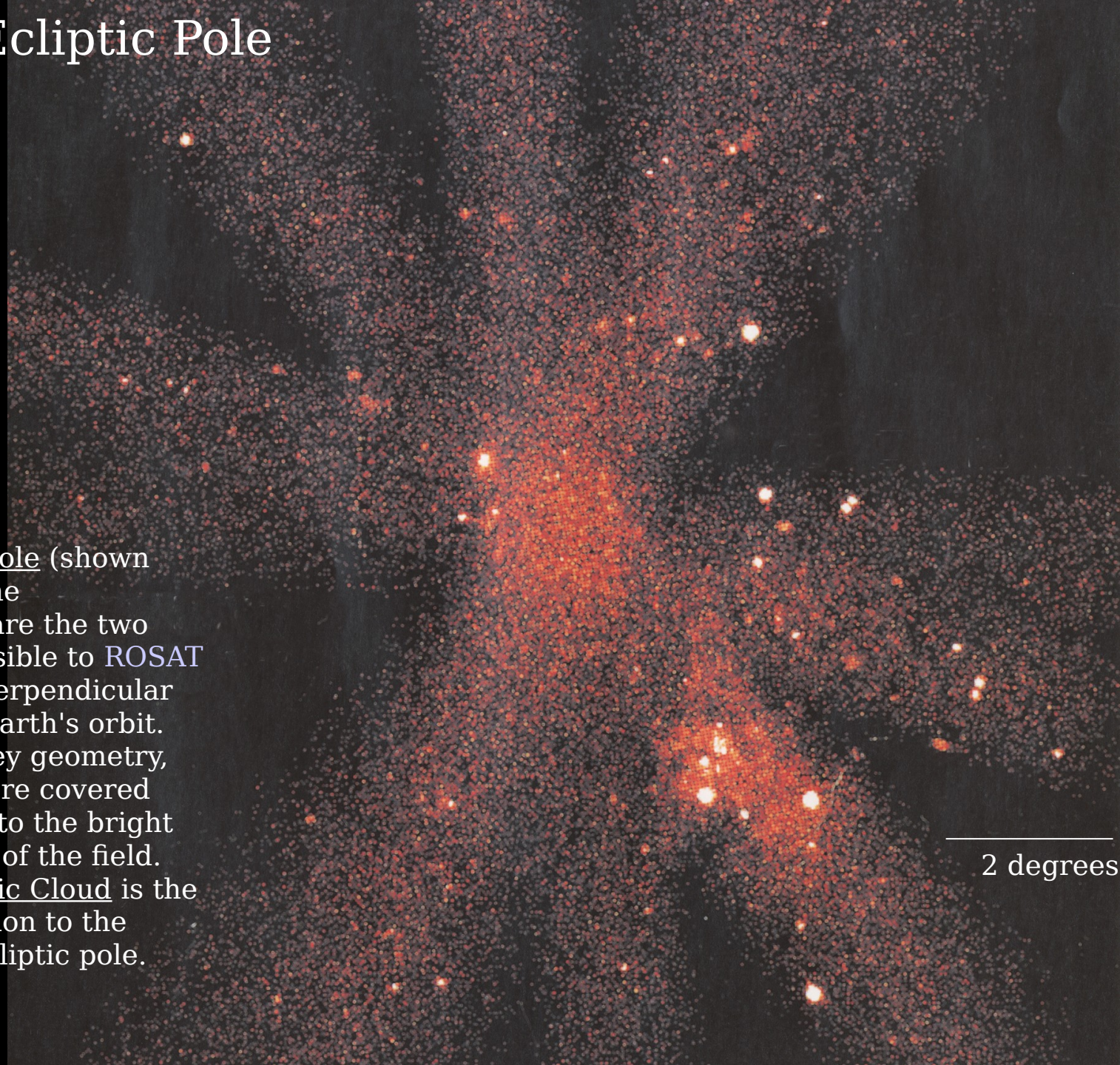


# The South Ecliptic Pole

The South Ecliptic Pole (shown here in X-ray) and the North Ecliptic Pole are the two locations that are visible to ROSAT at any time, being perpendicular to the plane of the Earth's orbit. Because of the survey geometry, the ecliptic poles were covered every orbit, leading to the bright region at the center of the field. The Large Magellanic Cloud is the bright extended region to the lower right of the ecliptic pole.

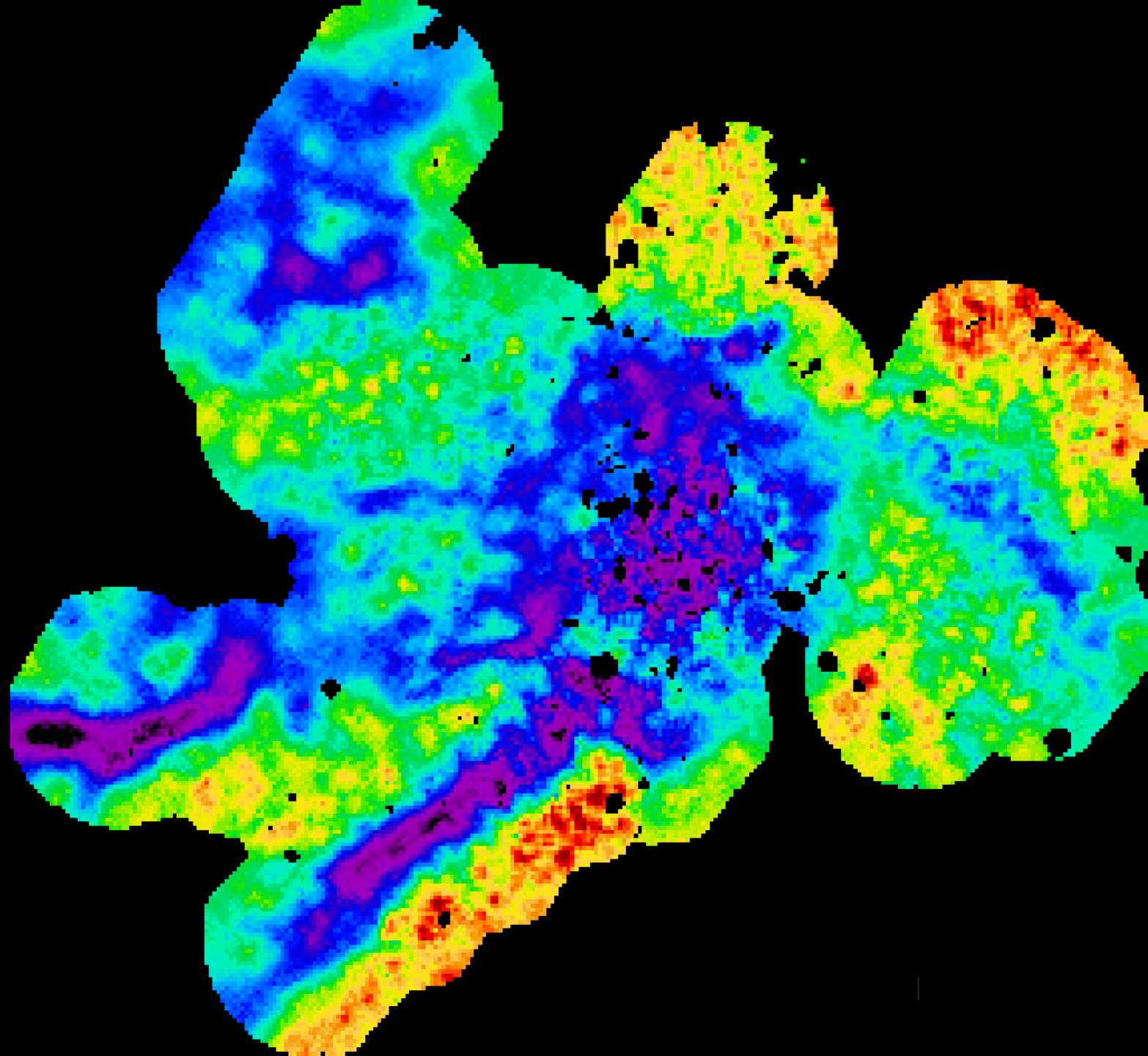
Instrument:  
ROSAT PSPC

Credit: MPE



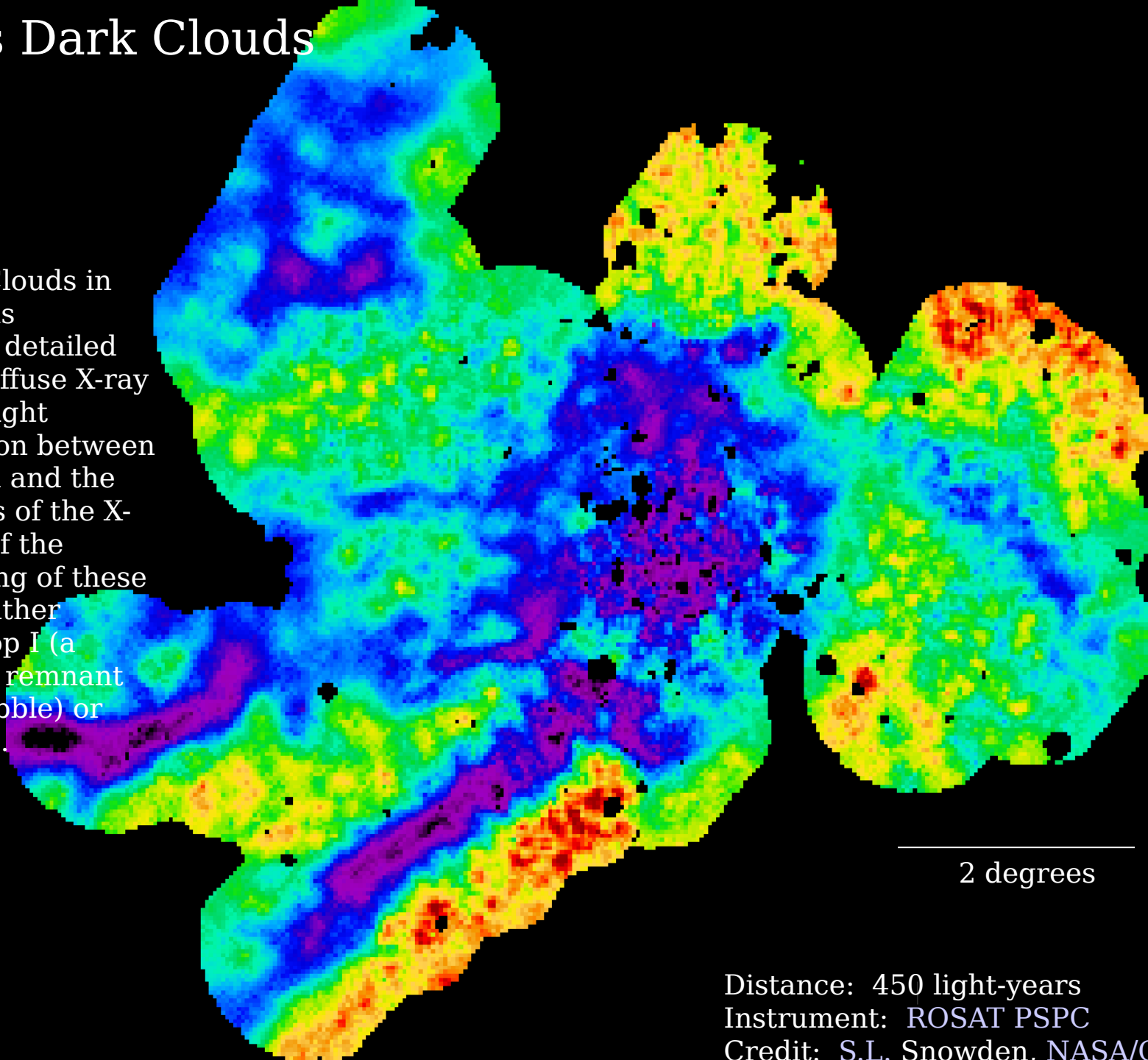
2 degrees





# Ophiuchus Dark Clouds

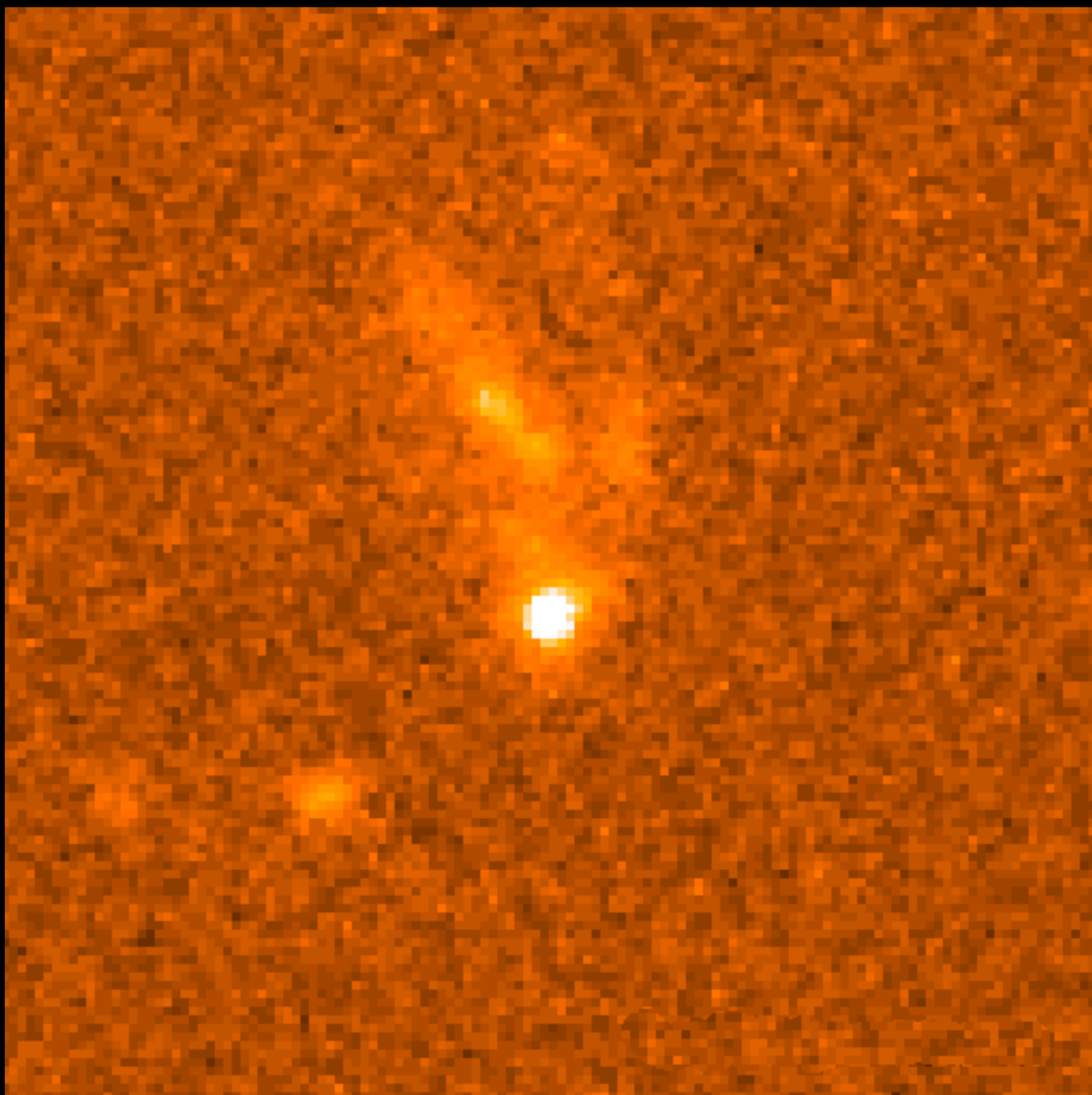
This mosaic of the Ophiuchus Dark Clouds in the 3/4 keV band is remarkable in the detailed structure of the diffuse X-ray background and tight negative correlation between the cloud material and the surface brightness of the X-rays. The origin of the strong back-lighting of these clouds might be either emission from Loop I (a nearby supernova remnant or stellar wind bubble) or the Galactic bulge.



2 degrees

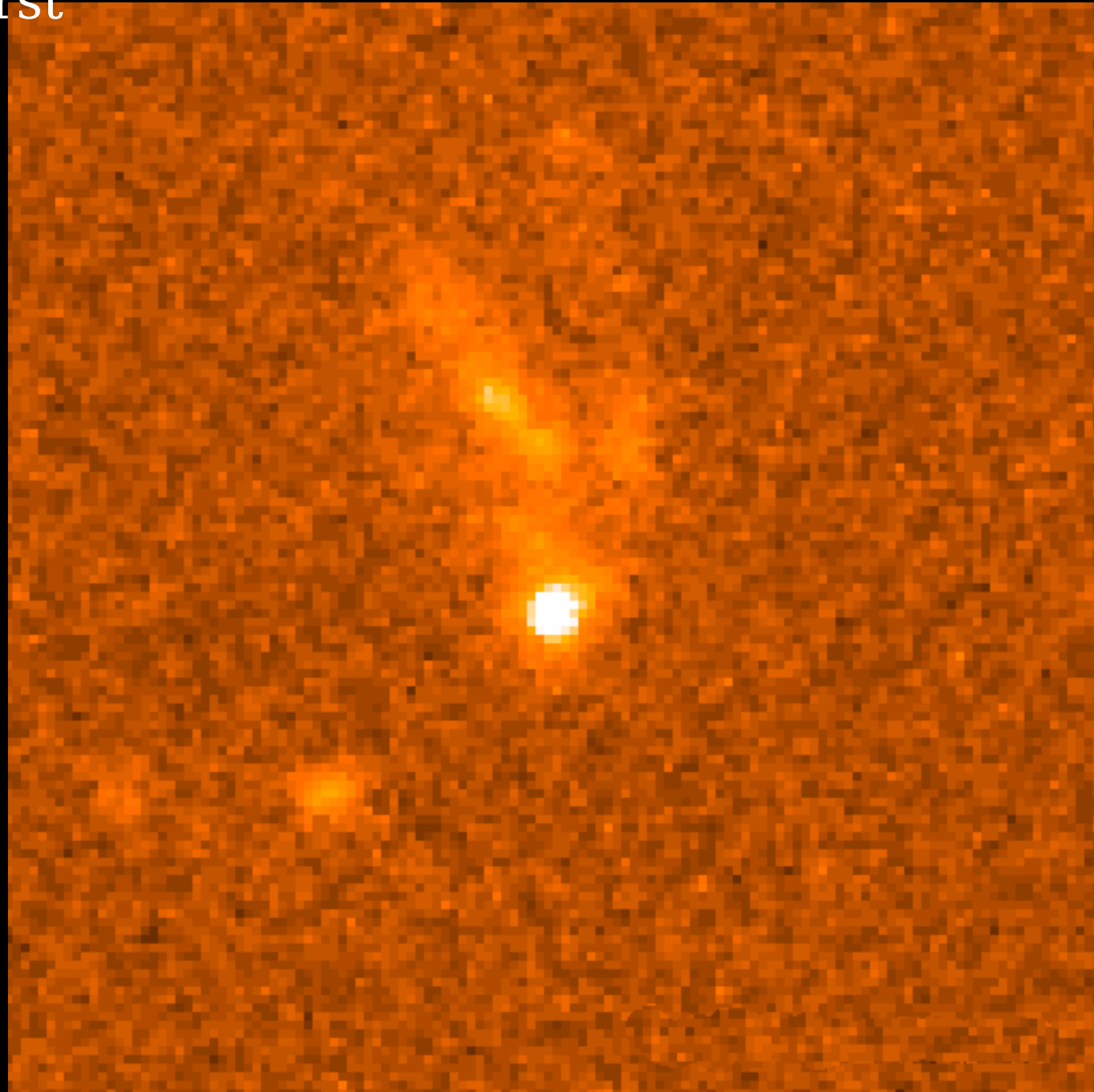
Distance: 450 light-years  
Instrument: ROSAT PSPC  
Credit: S.L. Snowden, NASA/C





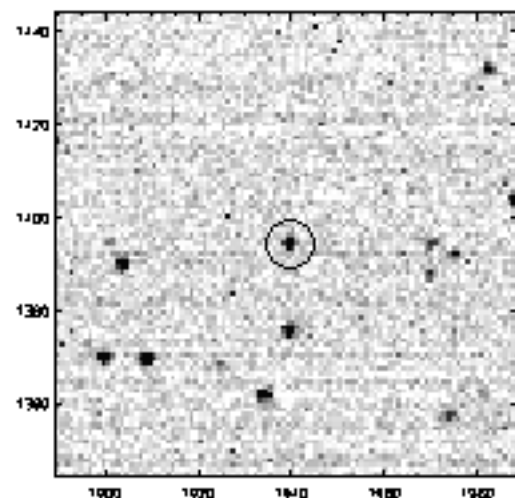
# Gamma Ray Burst

Gamma ray bursts occur with no warning, last only a few seconds, and produce more energy in that short period than the entire Universe combined. On January 23, 1999, ROTSE captured the first-ever optical images a burst at the very moment it was going off. Other telescopes captured its afterglow, as shown here. HST  
Credit: STScI

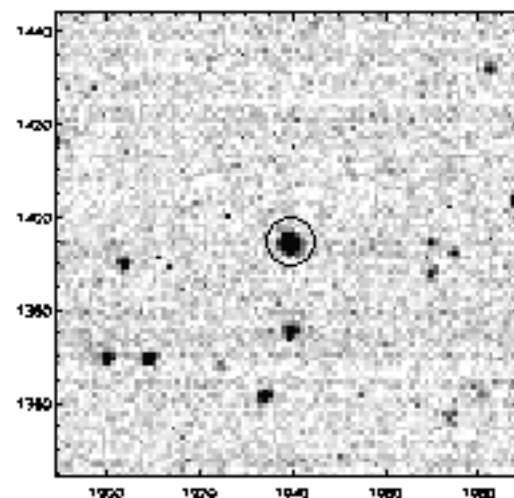




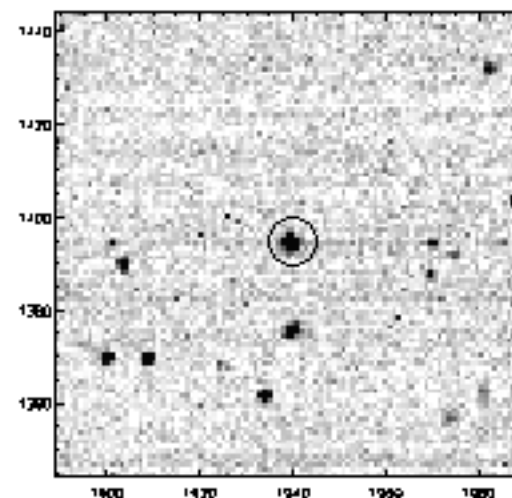
1999-01-23T09:47:18.30



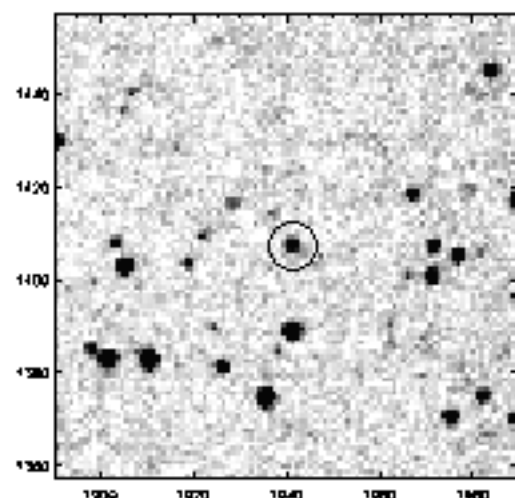
1999-01-23T09:47:43.50



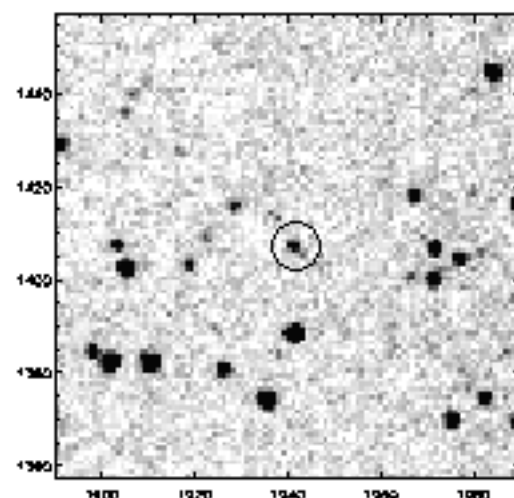
1999-01-23T09:48:08.79



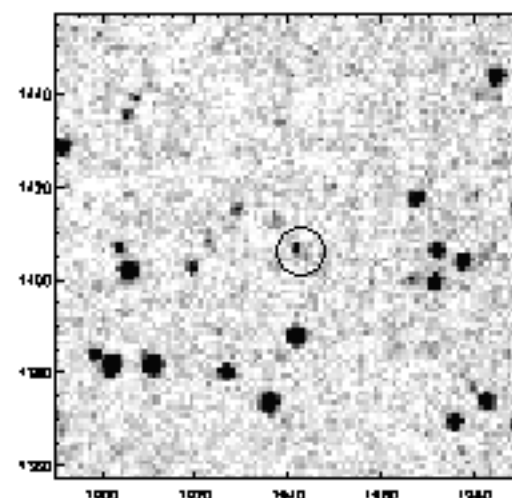
1999-01-23T09:51:37.51



1999-01-23T09:54:22.76

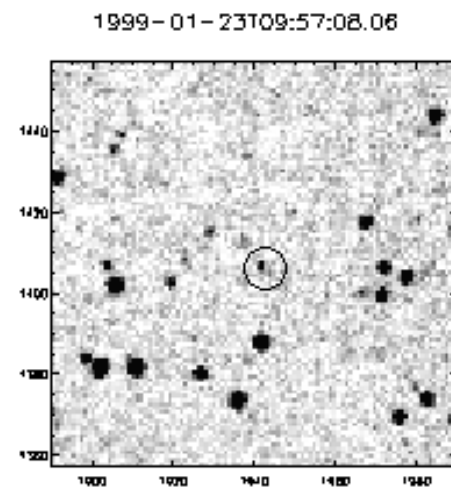
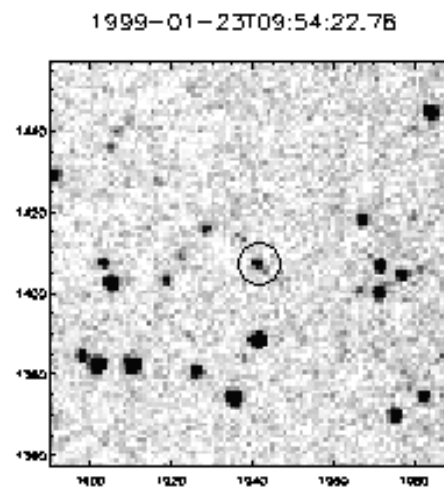
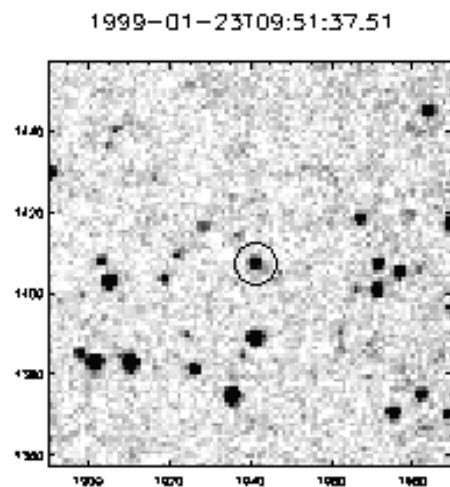
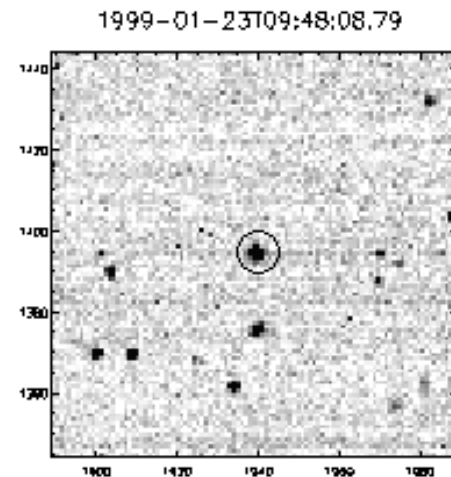
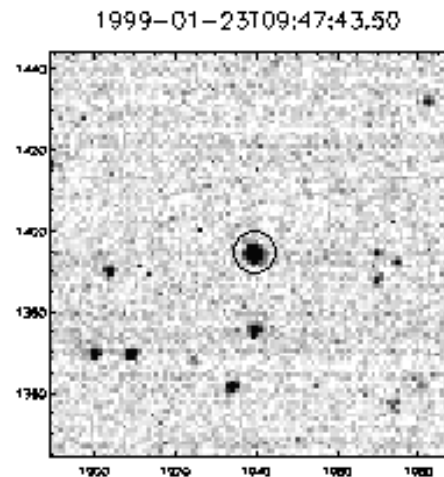
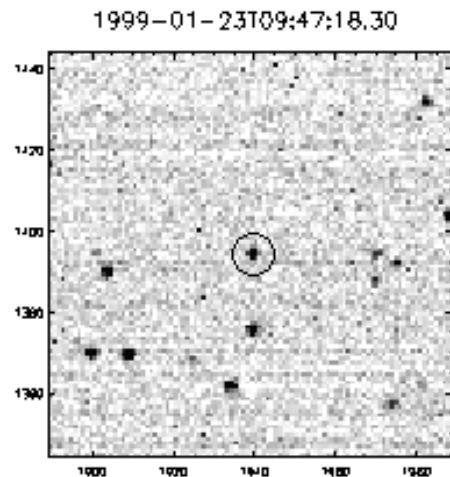


1999-01-23T09:57:08.08



# Gamma Ray Burst, Caught in Optical

On January 23, 1999, ROTSE captured first-ever optical images a gamma-ray burst at the very moment the burst was going off -- the "Holy Grail" for the hunters of these mysterious explosions, which occur with no warning, last only a few seconds, and produce more energy in that short period than the entire Universe combined.









# The North Polar Spur

The North Polar Spur -- perhaps the most spectacular coherent structure in the soft X-ray sky -- was completely mapped for the first time at high resolution in the ROSAT/PSPC survey. The North Polar Spur is part of a hot interstellar bubble created by winds of young, hot stars and several supernova explosions.

Instrument: ROSAT  
PSPC

Credit: R. Egger,  
MPE



10 degrees